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# INTERNATIONAL JOURNAL OF MOBILE AND BLENDED LEARNING

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# Ethical Considerations in Implementing Mobile Learning in the Workplace

*Jocelyn Wishart, University of Bristol, UK*

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## ABSTRACT

*Workplace based personal and professional development is essential for students in the health, social care and teaching professions. In this era of ubiquitous computing recording and reflecting upon learning and reviewing student progress in the workplace is easily enabled via mobile technologies. Yet researchers and student users in these settings continue to find using personal, mobile technologies a challenge; though now it is much less a technical challenge than one requiring institutional and cultural innovation in permissions and behaviours within these settings. This article describes the outcomes of a recent international workshop conducted with experts in the fields of mobile learning and education on prioritising areas of concern and establishing best practice. In conclusion it presents a framework for consideration by the mobile learning community that can be used to highlight or prioritise ethical considerations before conducting research into the use of mobile devices by students in workplaces and schools. [Article copies are available for purchase from InfoSci-on-Demand.com]*

*Keywords: Consent; Ethical Issues; Ethics; Mobile Learning, PDAs; Privacy*

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## INTRODUCTION

Workplace based personal and professional development is essential for students in the health, social care and teaching professions. All training

programmes for such students involve spending significant amounts of time (weeks or months) on placement in hospital, surgery, practice centre or school as relevant. Pilot studies have shown that mobile technologies such

as handheld computers, mobile phones and PDAs can effectively support this form of professional learning (Wishart et al, 2007; Treadwell, 2005) by being used to capture evidence to assist assessment. However, these involved the use of personal, private devices that can access and store a wealth of information including images and have the potential to attract debate over ethical concerns arising from both research into the use of mobile devices and the process of teaching with them.

Ethical concerns are not new. Early work on concerns over potential misuse of information and communications technologies developed into the field of computer ethics and focused on the special nature of information itself. Over twenty years ago Mason (1986) introduced four ethical concerns specific to the Information Age:

- **privacy:** which information can be withheld and which cannot, under what conditions and with what safeguards;
- **accuracy:** the authenticity, and fidelity of stored information;
- **ownership** - both of the information and the channels through which it is transmitted
- **accessibility:** what information does a person or an organization have a right or a privilege to obtain, under what conditions and with what safeguards?

This led to an emphasis on issues of ownership and accuracy which was

maintained by Anderson and Blackwood (2004) who were the first to publish on the debate on ethics of the use of mobile technologies in education. They focused on college and higher education (HE) with particular reference to legal and privacy issues such as ownership and copyright. However, whilst Anderson's (2005) second paper on privacy issues further develops implications of tracking personal use, neither paper considers the use of mobile phone cameras nor do they address issues associated with the need to capture evidence of learning during a college or HE student's work based learning placement for later assessment.

More ethical questions pertinent to the special nature of mobile learning were presented to the mobile learning research community by Traxler and Bridges (2004). They presented an outline for ethical mobile learning research that highlights three areas: informed consent, confidentiality and differentials in power between researcher and researched associated with age and class. The issue of informed consent was recently the subject of discussion across the UK when the Cityware project at the University of Bath (O'Neill et al, 2006) hit the news under the banner headline, "Bluetooth Big Brother uses mobiles and laptops to track thousands of Britons." It is difficult for researchers asking for consent to be clear about how much participants really understand about the capability of their mobile devices. Traxler and Bridges (ibid) also highlight privacy with reference to

researchers' access to system data logs that record activity and location. Confidentiality, linked then by Traxler and Bridges to how difficult it is to ensure in cyberspace as technical systems are complex and leaky, has also become big news in the UK today as portable, media storage devices such as mobile phones and, in particular, USB memory sticks, containing personal data on up to hundreds of thousands of individuals are regularly being reported lost or stolen. Privacy and confidentiality are also at the forefront of workplace managers' concerns as will be discussed later with respect to students using mobile devices to support their training.

Whilst very aware, as educational researchers, of ethical rules and guidelines currently governing educational research the mobile learning research community has yet to prioritise sharing the ethical challenges in their research. For example, searching the proceedings of MLearn 2007 brings up only one presenter referring to ethical issues specific to the use of mobile devices (Traxler, 2007) and that is in discussion of changing social etiquettes and codes of practice about the use of mobile devices in different subcultures. Also ethics was apparently not initially considered a big enough issue for separate consideration at the two day long Big Issues in Mobile Learning discussion workshop convened by the Mobile Learning Initiative of the Kaleidoscope EU Network of Excellence (Sharple, 2006). Its foci were: issues of defining mobile learning, resolving conflicts be-

tween informal learning and classroom education, evaluating mobile learning, supporting innovative educational practices, integrating learning on mobile devices with other areas of learning, affective issues such as motivation and learner control, how to enhance the experience of learning and interaction without interfering with it and, lastly, how to support mobile inquiry and collaborative learning. However, concern amongst the workshop participants over ethical tensions brought about by the advent of personal, portable devices that allow users to merge private, informal information gathered to support a personal interest with public, formal information tendered to a researcher or a teacher cropped up regularly. Winters (2006) concluded that the ethical dimension remains critically important and is becoming even more relevant as we move towards a world in which ubiquitous technology is ever present.

All academic researchers in education are made aware of the importance of this ethical dimension; the British Educational Research Association (BERA) revised their guidelines for educational research in 2004 (BERA, 2004) in an effort to recognise the diversity of the association members' research and their ethical concerns. This has resulted in a 13 page document based on the principle that all educational research should be conducted with an ethic of respect for the person, knowledge, democratic values, the quality of educational research and academic freedom. The guidelines are laid out by considering issues of

responsibility; firstly to participants and subsequently to sponsors of research and the community of educational researchers. Responsibilities to the participant include the need for voluntary informed consent, to consider the pros and cons of deception carefully, offering the right to withdraw, taking particular care with children and vulnerable young people or adults, incentives and possible detriment arising from participation in research and issues of privacy and disclosure of the results. It is intended that the Council of the British Educational Research Association will review and continuously update the guidelines to ensure that, as circumstances change, the Association provides the most up to date support for its members. With similar intentions the published Ethical Standards of the American Educational Research association (AERA, 2000) currently forming a 12 page document were revised in 1996 and in 2000.

Wali (2007) exemplifies this guidance in her study of where and how students used portable laptops. She described how addressing these ethical challenges and concerns can become a lengthy process when she presented her research in a workshop run by the Centre for Work Based Learning at the Institute of Education, London, UK. First, it was necessary to gain students' informed consent to install system monitoring software in their laptops to gather data about their use of the laptops before actually installing the software. Students also had to be notified of the reason for such recording, the range of

uses to be made of its outcomes and their agreement sought on releasing the outcome into different kinds of public domain. Second, students' informed consent to be observed in formal and informal settings had to be obtained. Third, students' anonymity and privacy had to be ensured by removing students' identification from the data, especially the log files, once collected and ensuring that the collected data is not accessible to anyone other than the researcher. The students' main concern was their privacy and anonymity. Further ethical and practical challenges included: getting the different universities involved to agree permission to observe students in informal settings and to installing system-monitoring software on students' laptops. The universities were also concerned about confidentiality and students' privacy. Also some technical problems were encountered as a result of conflicts between the security software installed on students' laptops and the system monitoring software.

However, a different perspective arises when we consider mobile learning in the workplace, what about the employing company's rights to privacy and confidentiality? Where the workplace involves vulnerable people such as patients in hospital and young children they too have rights to privacy and confidentiality and to be fully informed before they give consent to being involved in research. Yet it is in those very same workplaces that mobile devices are proving useful in supporting trainees. Recent examples

now being seen include teacher trainees working with children and young people (Wishart, 2006) and students within healthcare settings who need to be able to capture images (Taylor et al, 2007) and sometimes video of clinical competencies and skills. Many teachers and lecturers are also mobile learning researchers.

Guidance on the use of mobile technologies in schools is provided by Becta, the UK government agency leading the national drive to ensure the effective and innovative use of technology throughout learning. Their guidance centres on the role of an acceptable use policy. They suggest that when formulating a school's policy, staff should consider whether:

- pupils are aware of the safety issues relating to mobile devices? Risks include always being accessible (and hence exclusion from other forms of social contact), inappropriate and unsolicited contact by text message, text overuse and misuse, and bullying by mobile phone. And with reference to camera phones, maybe having their photograph taken without their knowledge or permission.
- pupils are aware of the new forms of service and content increasingly available via mobile phones, such as picture and video messaging, Bluetooth, commercial content, and location-aware services, and the safety issues relating to these?
- pupils know how to protect themselves from mobile phone theft? Are they aware of procedures for disabling the phone if it is lost or stolen?

It is unsurprising that schools raise concerns about such potentially disruptive devices and many prefer to ban mobile devices outright. It becomes very hard for a trainee teacher to use a mobile device to support their learning or record progress if that is the case. However, Becta's own research into the use of mobile devices by pupils indicates that mobile phones can be a very productive way for schools to augment access to tools for computing, communication and photography (Hartnell-Young and Heym, 2008). Equally young pupils in primary schools can use mobile devices productively and autonomously to support their learning (McFarlane et al, 2008).

Guidance on the use of mobile technologies in health care settings from the UK Medicines and Healthcare products Regulatory Agency (MHRA, 2004) acknowledges potential benefit of mobile devices and no longer recommends an outright ban within a hospital environment. Recently the UK Department of Health issued new guidance that allows patients the widest possible use of mobile phones in hospitals where the local Trust's risk assessment indicates that such use would not represent a threat to: patients' own safety, or that of others, the operation of electrically sensitive medical devices or patients'



privacy and dignity (Department of Health, 2008). However, most individual trusts, exemplified here by the West Sussex Hospitals Trust, maintain concerns especially with respect to the ability to take photographs on mobile devices.

*The patients' confidentiality, dignity, privacy and protection of data is paramount. Only officially authorised Trust equipment, for a direct legitimate clinical reason, will be used to record, store and communicate electronic images. The use of any other mobile technology, for the purpose of taking photographs is prohibited throughout the Hospital* (West Sussex Hospitals Trust, 2006)

Yet, once permissions are arranged, as in the Assessment & Learning in Practice Settings (ALPS) Centre for Excellence in Teaching and Learning (CETL) pilot run at Leeds Metropolitan University (Taylor et al, 2007), the use of mobile phones to photograph patient care to evidence dietetics and physiotherapy students' learning proved successful. Benefits of using a mobile device to send images and text to Mediaboard (a web-based multimedia message board) in order to create a learning log included better access to and recording of information, greater tutor and peer support and ICT skills development.

These pilot studies researching the potential of mobile learning to support trainees and students in the workplace are stretching the current guidance espe-

cially with respect to the use of images and informed consent. In order to test the potential of mobile devices to support learning more widely we need ready answers to researchers' and students' questions such as the following:

- What if I see inappropriate images on a students' mobile phone?
- How do I set up a study on handhelds in a college where the use of mobile devices is banned?
- Can I take photos of a patient's cuts and bruises on my PDA for my wound care project?
- A trainee has sent in video of his pupils as evidence of teaching through role play – can I show it to others?
- Am I sure that the use of mobile phones with young people is actually safe?

It was decided consult more widely over these concerns and a discussion workshop on ethical issues affecting mobile learning was set up to invite the members of the international research network 'Adding a Mobile Dimension to Teaching & Learning' to debate these issues and recommend ways forward.

## METHOD

A discussion workshop is a recognised method of collaborative knowledge construction through discussion and debate amongst peers or experts. The 'Adding a Mobile Dimension to Teach-



ing & Learning' research network focuses on handheld technologies such as PDAs, Smartphones, mobile phones, play stations and MP3 Players and how they can support teaching and learning. Its members include internationally respected researchers and practitioners in mobile learning. The network has run interdisciplinary workshops funded by the Institute of Advanced Studies at the University of Bristol since April 2006. The network itself has grown to over 100 individuals and each workshop has been attended by 12 to 24 members. Details and notes from previous discussions are available online at <http://www.bris.ac.uk/education/research/networks/mobile/>. Whilst the number of members of a particular discussion workshop is not large enough to be a representative sample of the entire population; the findings from the group debates are agreed amongst the workshop participants whose expertise and experience ensure conclusions are reliable and valid.

A workshop on ethical issues affecting mobile learning was arranged to take place in June 2008 and participants recruited through advertisement to the IAS 'Adding a Mobile Dimension to Teaching and Learning' research network. Therefore participation was voluntary and participants were fully informed as to the purposes of the workshop. In order to facilitate knowledge construction the workshop was designed to promote discussion and engage both participants and presenters in active debate. Its aims were for the participants to identify the

range of ethical considerations linked to mobile learning in professional workplaces through discussion and to debate whether or where current ethical codes of practice need updating. Three key people, experts working in the field of mobile learning, were invited to share and lead discussion on the ethical issues that concern them from their particular perspective. Each gave a 10-15 min introductory presentation designed to stimulate thought and discussion.

They were:

- John Traxler, Director of the Learning Lab and Reader in Mobile Technology for e-Learning at the University of Wolverhampton and co-author of "A Handbook of Mobile Learning for Educators and Trainers";
- Dawn Woodgate, Research Fellow at Bath University Dept of Psychology who has worked with young people and teenagers on several projects e.g. Participate involving mobile technologies;
- Lucinda Searle, Primary E-Learning Consultant at the City Learning Centre in Brislington who manages the Hand-e-Learning PDA project in Bristol primary schools.

Their presentations are available from the Adding a Mobile Dimension to Teaching and Learning website. Seventeen participants attended the workshop itself, their backgrounds included medical education, school and

university education, teaching support, media and research.

Following the presentations the workshop broke up into three separate small group discussions led by each presenter where groups of 5-6 gathered to discuss what they felt to be the key ethical considerations arising in researching mobile learning and in using mobile devices in schools, colleges and universities. The three foci were:

1. Ethical considerations in research into mobile learning
2. Ethical issues arising in students and young people's use of mobile technologies
3. Ethical concerns occurring with young children's use of mobile technologies

Each group then presented their conclusions as to what they felt were the key ethical issues in these fields to the entire workshop. In the following plenary discussion the participants' conclusions from the small group discussions were debated with the whole group and set of key ethical issues agreed. The participants were also asked to agree recommendations as how the mobile learning research community should proceed.

During the workshop participants made notes on flipchart pads which were used both to present their ideas to the group and as a record of the discussions. The plenary discussion was also audio recorded with the participants' permission.

## DISCUSSION OF RESULTS

Participants concluded that there were six key issues that underpinned the ethical considerations currently arising in research into mobile learning and that those issues are particularly prevalent when researching students' use of mobile devices to support learning on placement. These are shown in Table 1. In addition the participants pointed out that each key issue had a parallel consideration relevant to the use of mobile devices in schools.

The first key point was that researchers and practitioners look to a professional code of conduct for guidance. A number of codes of ethical conduct were known to the group. Some examples are:

- BERA (2004) Revised Ethical Guidelines for Educational Research - just over 4000 words
- AERA (2000) Ethical Standards of the American Educational Research Association - 3,400 words
- ACM (1992) Code of Ethics and Professional Conduct - 3000 words
- BCS (2006) Code of Conduct for BCS Members - 1,400 words

In addition where the workplace involves children, young people or vulnerable adults, as is the case for schools and healthcare settings, a trainee must learn about their duty of care. For example, a teacher's duty of care to underage pupils is to meet the standard of care

*Table 1. Key ethical issues in mobile learning*

RESEARCHING MOBILE LEARNING	MOBILES IN SCHOOLS
Ethical codes of conduct	Duty of care
Informed consent	Consent – Whose? – Local authority, school, pupil, parent?
Ownership of device, information on it and data collected	Ownership – who owns the device? Who is responsible for the information stored on it?
Images – ease of taking, sharing & publishing	Images - of children
User generated content & personal data	Children (and their family's) personal information
Data protection, storage and loss	Storage of pupils' work

that can be expected of a competent professional, acting within the constraints of the circumstances (NUT, undated). This duty of care does not derive from legislation, but it has been upheld in the English courts as a duty which has derived from laws established through common use and case law precedents and is sometimes referred to as 'in loco parentis' ie a teacher should act as a prudent parent would.

Researchers and practitioners do their best to comply with the above standards as exemplified in the introduction to this article (Wali, 2007) however, new mobile technologies that seamlessly mix personal and work based information are not directly addressed by these codes. The issue of informed consent, the second key issue, is a particular example as participants are often unaware of the entire range of functions of their mobile devices and/or the details of the information that their

mobile device records and which can be unintentionally shared with a teacher or researcher. These include information as to their location as well as personal notes and images.

Functions that are not understood well by many mobile device users include browsers that store Internet histories and Bluetooth. Dr Vassilis Kostakos, research associate on the Cityware project at the University of Bath, said: "The really nice thing about Bluetooth is that when you are walking down the street, although you are not talking to anyone, your Bluetooth device can be talking to other devices." (Kostakos, 2007) Not everyone in the locality being observed agreed with him that being recorded for the research project as a result of leaving Bluetooth set to 'discoverable' was "really nice".

Greater sharing of information between home and school is reported to be a positive feature of the use of

mobile devices in schools (McFarlane et al, 2008) however, a few teachers have been surprised by items left on the children's PDAs by their parents. New social codes that have arrived with social networking sites such as Facebook, MySpace, Bebo and Flickr and the popularity of blogging indicate that considerable numbers of people are becoming less concerned about sharing personal information than in previous years.

The third key issue was device ownership with particular reference to children or students using mobile devices on long term loan or acquired through schemes that part-fund purchase over time such as those being deployed in some UK schools. If the device user does not fully own the device questions arise over who is responsible for the data stored on that device.

Also who owns the rights to the images taken by a trainee with a mobile device in the workplace, the employer, the training institution or the trainee themselves? The ease of taking and publishing images with mobile devices was highlighted as another key issue and is clearly one of the most important concerns with respect to training in the workplace. Many employing institutions have actually banned camera phones from the workplace because of concerns over possible breaches of confidentiality whether accidental or deliberate. This is a particular challenge in healthcare and school based settings (West Sussex Hospitals Trust, 2006, Wishart, 2006) where trainees could

use mobile devices to record notes and images to support later revision and reflective practice but the current sociocultural climate and concerns over storage and protection of images leaving the workplace prevail. It is interesting to note that searching the image sharing website Flickr in October 2008 with the phrase "my teacher" returned 44,581 images. Not all of these are taken in school but many are. This upswing in user generated content (another key issue) for the wide range of social networking sites provides a ready publishing outlet, not only for images, but also for personal data.

The final key issue noted was data protection. Small mobile devices often containing important personal data and/or records of activity on behalf of an employer are regularly lost or stolen. This data may well also be uploaded onto a home computer – we need to consider who is responsible for keeping it safe? Where data acquired by means of a mobile device is to be assessed for a trainee's qualification or a child's progress in school it needs to be held safely. But by whom and for how long? What happens when the storage system becomes full? The UK Data Protection Act (Great Britain, 1998) clarifies a number of terms, makes provision for data subjects and data users but doesn't really address these issues where images and notes are recorded on personal devices in a small-scale way.

As a result of debates during the workshop on *'Ethical Issues affecting Mobile Learning'* the participants

concluded that there is currently a tension developing between our current legal and professional codes and new multi-cultural, multi-generational social codes. This led them to question whether professionals engaged in mobile learning should continue to closely and unquestioningly follow current ethical guidance for researchers and teachers that result in comprehensive but complex detailed consent forms and guidelines. It may be better to address ethical concerns by working from the original ethical principles rather than from formal codes such as BERA, AERA and BCS which will have to be updated now and regularly for the foreseeable future to take into account issues such as those discussed earlier in this article. The code of conduct for the ACM does indeed consider moral imperatives (ACM, 1992) and its structure is framed by these imperatives and issues of professional responsibility. However its focus is solely on working in the field of computing and information technology.

Others though have shared similar concerns. Working in the then developing field of computing and information technologies in the 1940s and 50s led Norbert Wiener, now known as the founding father of Cybernetics, to consider the social and ethical impact of the coming “automatic age” (Bynum, 2005). He proposed three “great principles” of justice (Wiener, 1954) which are that:

- Justice requires freedom i.e. the liberty of each human being to develop freely the full measure of the human possibilities embodied in him.
- Justice requires “the equality by which what is just for A and B remains just when the positions of A and B are interchanged.”
- Justice requires benevolence that is “a good will between man and man that knows no limits short of those of humanity itself.”

These resonate well with three of the four basic principles that are largely accepted by the biomedical community and used to guide moral deliberations today (Mallia, 2003). These four principles were originally described by Beauchamp and Childress (1983) in their discussion of principles of biomedical ethics. The fourth principle is non-maleficence which gives us:

- Beneficence (doing good);
- Non-maleficence (avoiding harm);
- Autonomy (respecting choice) and
- Justice (equality of access to resource)

In addition, where the workplace involves those less able to look out for themselves such as in medical or educational contexts responsible adults such as doctors, nurses and teachers have a duty of care.

## CONCLUSION AND RECOMMENDATIONS

There are two conclusions arising from our discussions of the research considered for this article. The first, that there are six key ethical issues currently arising in researching mobile learning, each of which has a matching concern relevant to considering trainees' use of mobile devices to support learning in workplaces such as schools and healthcare settings. The second is that a return to the fundamental principles underpinning ethical behaviour may be a more helpful way forward for the mobile learning community facing challenges applying current ethical guidance than to address every item in whichever code of conduct is most applicable.

The above two conclusions are combined in following framework which is presented by the author in Table 2 here for further consideration by the mobile learning community of the 21<sup>st</sup> century. Each cell in the table where a key ethical issue intersects with an underpinning ethical principle becomes an opportunity for reflection as to what is current practice and what is good practice. Codes of conduct have been omitted from the original list of key ethical issues as it is suggested that the framework is used to generate discussion amongst researchers before checking the appropriate code in order to more freely suggest the range of issues to be addressed.

Not all intersections will give rise to relevant concerns depending on the situation under consideration and in

*Table 2. Framework for prioritising ethical issues for consideration before engaging in research into mobile learning in workplaces and schools*

	Do good	Avoid harm	Respect user choice	Share resources fairly
Personal information and images				
Informed consent				
Ownership				
Data storage and protection				
User generated content				

some instances it will be hard to balance principles. For example with using mobile devices to capture and share images ‘avoid harm’ may conflict with ‘respect user choice’ however, the act of considering the ethical issues involved will alert the researcher or educator to the need to come to an agreement with participants or students respectively with respect to that key issue.

The following scenario is presented in order to exemplify the framework’s potential.

*A student science teacher is equipped for a research project investigating teaching with handheld devices with a web enabled mobile phone containing an integral pico-projector that can display video, web pages, contacts etc. on a nearby surface. The student has an unlimited data contract and can quickly and easily find reference websites and animations to illustrate the concepts their class is working on. These can be shown to small groups by projecting on the nearest wall or flat surface.*

*Table 3. Ethical issues to be prioritised before researching student teachers’ use of pico-projection on handheld devices in schools*

	Do good	Avoid harm	Respect user choice	Share resources fairly
Personal information and images	What personal data would it be useful to the student teacher to store on the device?	How will the researcher treat any participants’ personal information?	Has the school given approval to the study?	
Informed consent	Is the student teacher aware that any personal data/images stored by them may be seen by the researchers? Are the class aware of the potential disruption?		The student teacher or their class may decide not to continue further with the project at any point	
Ownership		Are the animations/video to be used licensed for public/education?		How are the devices to be distributed?
Data storage and protection	Will the student teacher need to store pupil info on the device? What protection/permissions need to be in place?			
User generated content			If student teacher chooses to project a pupil’s work do they need permission?	
Projecting animations/ video to small groups	How will quality of resources to be projected be managed?	How to avoid sound/images disrupting rest of class?	Is there a planned communication channel for feedback between researchers, student teachers and pupils?	Which classes and which groups will participate in the project?



The framework can then be used as indicated in Table 3 to help suggest the questions over ethical issues that the researchers need to consider how best to manage. Note another row is needed that refers to the specific nature of the proposed project.

The framework described here was presented as a work in progress at Mlearn 2008 and responses are invited from the mobile learning community as to the viability, feasibility, possibilities, practical and ethical challenges involved in its use.

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## ENDNOTE

- <sup>1</sup> <http://www.bristol.ac.uk/education/research/networks/mobile/events/iaswshop7notes>

*Jocelyn Wishart is a senior lecturer in education at the University of Bristol. She became involved in mobile learning through her interest in using handheld devices to support teacher trainees on placement in schools. She has run two small scale projects funded by the Teacher Development Agency that have shown the devices can be useful in supporting both learning and teaching and any technical issues resolved. A current project focuses on the use of PDAs and smartphones to support trainee teachers in developing as reflective practitioners through the use of e-portfolio technology. Her interests lie primarily in the psychology of mobile learning and in the corresponding pedagogy of using handheld devices for teaching. She is a member of the Kaleidoscope EU Network*

*of Excellence Mobile Learning SIG Steering Group, convenor of the IAS Workshop Series Adding a Mobile Dimension to Teaching and Learning, and moderator of the Teaching with Handhelds discussion group.*

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## *International Journal of Mobile and Blended Learning*

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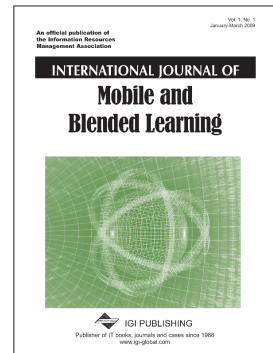
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